Carcinoma of the Colon and Rectum

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CARCINOMA OF THE COLON and rectum is the most frequent form of malignant disease of any internal organ common to both sexes. Although the incidence of carcinoma of the large bowel increases with age, 5 per cent of these lesions occur in persons under 40 years of age.

A carcinoma of the colon or rectum originates as a mucosal lesion. At first it causes bowel irritability and bleeding; much later the growth may cause mechanical difficulty, either because of its size or extent of infiltration of the bowel wall. Since there are no pathognomic signs or symptoms of colon or rectal carcinoma, all complaints which direct attention to the bowel demand careful investigation. The signs and symptoms vary according to the site of the lesion.

SYMPTOMS

Right colon. The primary function of the right colon is absorptive. The lumen is large and the content liquid. Symptoms of malignant disease are usually the result of secondary effects of the lesion, rather than obstruction. Carcinomas here tend to be large, cellular and ulcerated. They often cause anemia, fatigue and loss of weight. The type of anemia varies, depending on whether its origin is in blood loss or impaired absorption. The patient seldom notices the passage of blood in the stool. Some abdominal discomfort is usually present. This may consist of a sense of fullness or increased weight, or of tightness especially on the right side of the abdomen. Crampy or poorly localized pain is common. If there is a change in bowel habit, it usually consists of more frequent, loose stools.

Left colon. Here the basic process is storage, and constitutional symptoms of malignant disease in this area are conspicuously lacking. The dominant symptoms are change in habit and bleeding. Most often there is increasing constipation with abdominal cramps and distention, although sometimes persistent diarrhea is the reason for the patient's consulting a physician. Occasionally there is a sudden onset of complete obstruction with no prodromal symptoms. About half the patients notice blood in the stool; this may be bloody mucus, streaks of blood, clots or just a trace on the toilet tissue.

Rectum. The primary function of the rectum is to signal the defecatory urge. A rectal carcinoma frequently causes a false urge or a feeling of incomplete evacuation after a bowel movement. Characteristically bloody mucus, clots or bright red blood is passed. Pain occurs late. A change in the patient's usual bowel habit occurs frequently.

DIAGNOSIS

Often on general physical examination the patient has an appearance of vitality and wellbeing. This belies the serious nature of the disease causing the minor symptoms for which the physician is (often apologetically) consulted. Abdominal examination may reveal a palpable mass or evidence of distention. Localized signs of peritoneal irritation, simulating appendicitis or diverticulitis, may be present when the lesion is complicated by penetrating infection. Secondary abscess may form, with signs and symptoms which entirely overshadow the underlying neoplasm.

The old definition of a specialist as one who does a digital rectal examination is too often true. There is no excuse for omitting this as part of every general physical examination. The examination should be done with care. For example, some sigmoid tumors that are too high to be palpated through the lumen of the bowel may be felt through the wall of the rectum in the cul-de-sac. This finding must not be confused with metastatic disease or a "frozen pelvis." Barium enema examination should not be done until a digital rectal examination and sigmoidoscopic examination have been carried out.

Sigmoidoscopic examination and biopsy will not only establish the diagnosis in all carcinomas of

To appear as part of the revised Cancer Studies.

the rectum but also in the majority of all carcinomas of the colon. Even though this is a fact, many physicians are guilty of skipping this examination and relying entirely upon barium enema studies, which are not a hundred per cent accurate. Radiologists agree that lesions just out of reach of the examining finger are difficult to demonstrate by x-ray studies. This zone is a blind area, obscured by the bones of the pelvis, by placement of the rectal tube and balloon to introduce the barium and by redundancy of more proximal bowel. Sigmoidoscopic examination is of great value not only for direct visualization of tumors of the rectum and lower sigmoid, but to rule out non-malignant ulcerative disease and at times to verify that blood is actually coming from higher up in the colon. Examination without previous preparation of the patient often gives more valuable information than after laxatives or repeated enemas have been given.

A good barium enema study is not easily obtained. The clinician must work with the radiologist to ensure good preparation of the patient and provide accurate information. The attending physician and the radiologist should review the films and the problem together. Each has much to contribute, and there is less chance that a lesion will be missed or incorrectly diagnosed if they work together. This cooperation will help to prevent doing an upper gastrointestinal x-ray study in the presence of an obstructing colon lesion.

Colon washings and interpretation of recovered cells has not been satisfactorily perfected to include as a diagnostic measure for colon lesions.

DIFFERENTIAL DIAGNOSIS

Right colon. Symptoms may simulate those of peptic ulcer, carcinoma of the stomach, cholecystitis, renal lesions and various forms of enterocolitis. Granulomas (such as an amebic granuloma), although rare, may closely simulate a carcinoma. Appendicitis, particularly appendiceal abscess, may be easily confused with carcinoma of the cecum. Detailed and, at times, repeated barium enema examination is most helpful in making a differential diagnosis. Carcinoma of the proximal colon ranks in importance with carcinoma of the stomach as a cause of secondary anemia, so investigation of unexplained anemia should include examination of the colon and stomach.

Left colon. Differentiation of diverticulitis and carcinoma is a recurring and difficult problem. Carcinoma complicated by inflammation or abscess formation may produce the classical symptoms and signs of diverticulitis with pain, fever, leukocytosis and localized signs of peritoneal irritation. Diverticulitis may produce obstructive symptoms, with minimal recognizable signs and symptoms of inflammatory disease. Differentiation by barium enema examination is often difficult, sometimes impossible. Comparative studies of numerous films done at different times are of value. The filling defect of a carcinoma tends to remain the same, while the narrowing and irregularity due to diverticulitis is less constant. The shadow caused by a carcinoma is more abrupt and shorter, and the edges suggest infiltration. Diverticulitis usually results in a longer defect with tapered edges and variable appearance. Carcinoma causes a disruption of the mucosal pattern, which is best seen on post-evacuation films. The occurrence of transrectal bleeding is helpful in differentiating between the two. Bleeding does not often occur with diverticulosis and diverticulitis. When bleeding occurs with diverticular changes, it is usually sudden and profuse. A carcinoma of the left colon usually causes the passage of small amounts of gross blood which are persistently present. The passage of bloody mucus is associated with a carcinoma rather than diverticulitis.

At times the differentiation between carcinoma and diverticulitis cannot be determined before surgical operation. Carcinoma causes an intraluminal defect which can be felt as a proliferative edge when the bowel wall is invaginated. Diverticulitis is an extraluminal process that does not result in a hard, raised edge.

The irritable colon with symptoms of bowel irregularity is occasionally confused with carcinoma. On x-ray examination spasm may simulate a filling defect, but the defect is inconstant. An irritable bowel is the result of autonomic nervous system dysfunction in a susceptible person as a response to stress and tension. A positive approach to the problem reveals other signs and symptoms of anxiety and a pattern of distress at times of tension. An irritable bowel does not cause rectal bleeding.

Rectum. This is the commonest site for all large bowel carcinomas and they are often overlooked because there are many other causes of rectal symptoms. Most adults have hemorrhoids, many have hemorrhoidal difficulty, some of them also have carcinoma. Hemorrhoids will cause bright red rectal bleeding with blood noted on toilet tissue and in the water of the toilet bowl, and so will a rectal carcinoma. Not infrequently a patient can have bleeding from both a carcinoma and hemorrhoids. *No patient should have an anorectal operation until a carcinoma is ruled out.* Rectal tenesmus and a feeling of incomplete evacuation may be caused by a fecal impaction, ulcerative colitis, radiation reaction and various forms of pelvic disease. Digital rectal examination and sigmoidoscopic examination are necessary in establishing the diagnosis.

TREATMENT

There is only one curative treatment for carcinoma of the colon and rectum, and that is radical surgical excision of the involved segment of bowel together with wide removal of the corresponding area of lymphatic drainage. Good surgical judgment is paramount in the proper choice of the best method of surgical treatment to be used in each case. Every surgeon who accepts the responsibility of this kind of operation should be familiar with a number of surgical procedures. He must have knowledge of the different variants of polypoid disease as well as carcinoma. There are proper places for single stage and multiple stage operations, for primary anastomosis by an open or closed method, exteriorization, abdominoperineal surgical procedures, low anterior pelvic anastomosis, extrarectal anastomosis and "pull through" procedures.

At present, the goal of the surgeon should be less than 2 per cent mortality, 95 per cent operability, and a five-year cure in the majority of cases of all colon and rectal carcinomas. Proper preoperative preparation is important. Mechanical decompression of the colon, use of intestinal antimicrobial agents, correction of electrolyte, vitamin and protein deficiencies, transfusion and control of any coexisting disease should be carried out before definitive operation is performed.

At operation, attention should be directed to the possibility of multiple lesions; 5 per cent of the time there are multiple (primary) carcinomas. Care must be taken to lessen the chance of surgical implants. On occasion a lesion that is inoperable can be converted to an operable lesion by performing a proximal diverting colostomy. A large tumor that has invaded adjacent viscera, without known liver or lung metastasis, is sometimes cured by an extended resection.

Due consideration should be given to the psychological problems which are incurred by the patient with cancer. Optimism and assurance are justifiable on the basis of the relatively high possibilities of cure. Following recovery from successful surgical extirpation, repeated reassurance is frequently necessary for peace of mind and physical welfare of the patient. Minor subjective complaints or the development of symptoms of entirely unrelated illness may convince the patient that he is hopelessly riddled with cancer. This incorrect assumption is occasionally made by the physician. While such a possibility must necessarily be kept in mind by the physician, acceptance of the fact should never precede the establishment of proof that metastastic lesions are present.

The recurrence of symptoms of bowel irregularity or of bleeding is not necessarily evidence of recurrence of cancer. The incidence of development of a new primary lesion is sufficiently high to suggest this possibility. In such an event, the prognosis for cure by surgical excision of the new lesion is the same as it was for the first lesion.

PREVENTION

Unfortunately there is much confusion regarding polyps and carcinoma of the large bowel. Some of this confusion is related to the terms used. The word "polyp" denotes an elevation; it does not indicate the microscopic pattern of the elevation. Elevations that are due to mucoceles, mucosal hyperplasia, hypertrophied anal papillae, lymphoid hyperplasia, fatty deposits, hamartomas (juvenile polyps), inflammatory tissue (pseudopolyp), lipomas, lymphomas and so on, may present themselves as polyps but they are not adenomas. The word *adenoma* should be reserved for specific lesions with distinctive neoplastic but benign microscopic features.

Contrary to a few recent articles, there is much evidence that adenomas are associated with the presence and development of colon and rectal carcinomas. They have the same anatomical distribution and age incidence. Specimens from resections for large bowel carcinoma have, in addition, one or more adenomas in a third of the cases. Serial sections of carcinomas may show zones of adenomatous tissue, and the opposite is true. Lesions thought to be adenomas by experienced clinicians, yet not removed until later, have shown increased growth, change in appearance, and when finally removed were definite carcinomas. In most persons having familial polyposis a carcinoma develops by the time they are forty years of age unless the adenomas are removed. The finding of an adenoma on sigmoidoscopic examination sometimes leads to the finding of a carcinoma of the abdominal colon. Because of this, barium enema studies should be done whenever an adenoma is found on sigmoidoscopic examination. The true relationship between adenomas and adenocarcinomas must await basic knowledge as to their cause and histochemical patterns. For the present, adenomas are guilty at least by association with adenocarcinomas, and they should be treated unless the patient's general health suggests a limited life expectancy.

Authorities agree that papillary (villous) adenomas as part of their natural history become carcinomas. They characteristically occur in older people, and cause the passage of mucus. This outpouring of protein may cause hypoproteinemia and hypokalemia. On occasion an increased renal work load occurs that is reflected by albuminuria and non-renal azotemia. Papillary tumors usually have a large base, and multiple biopsy is necessary to

help evaluate them properly. Palpable induration in a papillary tumor usually indicates carcinoma. When carcinoma is present, a cancer resection should be done. Benign papillary (villous) adenomas should be excised, not fulgurated, lest they recur. With benign lesions the entire thickness of the bowel wall need not be excised. There are many ways to gain surgical exposure of low rectal papillary tumors: Complete sphincter relaxation under spinal or saddle block anesthesia, posterior sphincterotomy, posterior proctotomy.

Another dangerous lesion is the sessile adenoma. Large (over 0.5 cm) or ulcerated lesions visible on sigmoidoscopic examination should be biopsied. For non-ulcerated lesions less than 0.5 cm in diameter —so small that not enough untraumatized biopsy material could be obtained for precise microscopic evaluation—destruction by electrofulguration is permissible. A persistent shadow on x-ray examination suggesting a sessile lesion may be a carcinoma with or without benign adenomatous tissue. Much of the argument about polyps is academic, since only the pathologist can evaluate the growth and this necessitates biopsy or surgical excision.

A pedunculated adenoma suggests a slow rate of growth allowing for redundant mucosa as a response to peristaltic activity, to form a pedicle. The presence of a pedicle increases the chances for complete local removal, nothing more, as it does not change the nature of the adenoma nor is it part of the adenoma.

Pedunculated adenomas seen on sigmoidoscopic examination should be completely removed with a segment of the pedicle by means of a snare, providing the base of the pedicle can be controlled. This allows for complete microscopic study, and if there is no definite invasive carcinoma this constitutes adequate treatment.

A pedunculated tumor, noted by x-ray examination, does not always present a benign adenoma. Polypoid carcinoma does occur; and, again, only the pathologist can evaluate the histological pattern of the growth. We believe strongly in competent frozen section study of questionable polyps at the time of laparotomy.

As the clinician must not abuse the word *polyp*, so the pathologist must not abuse the word *carcinoma*. Terms such as *carcinoma-in-situ, carcinoma stage I, occult carcinoma, atypism,* and *adenoma malignum* only confuse and compound the problem. The question is the presence or absence of carcinoma. If carcinoma is present, is local excision adequate treatment or is a resection indicated? The clinician and pathologist must work together, each telling what he sees and through proper communication regarding the gross and microscopic appearance of the lesion arrive at a proper decision, in the best interests of the individual patient. Certainly factors such as location of the lesion, age, family history, obesity, general health and emotional makeup of the patient will influence the decision. These same factors have to be considered regarding abdominal exploration for a polyp demonstrated by x-ray examination. Artifacts may cause a shadow suggestive of a polyp on x-ray examination. Frequently the x-ray study should be repeated to make sure a persistent filling defect is present before abdominal exploration is undertaken.

SUMMARY

Carcinoma of the colon and rectum is still the most common form of malignant neoplasm occurring within the body. Curability is directly proportional to early diagnosis. Diagnosis in most cases can be made by careful digital rectal and sigmoidoscopic examination. Meticulous x-ray studies are indicated if the diagnosis is not clear after direct examination. Polypoid lesions of the colon may be premalignant adenomas, frank carcinomas or a variety of other unusual lesions. Proper diagnosis and treatment of these lesions must be based on careful microscopic study and clinical evaluation.

ACKNOWLEDGMENT: The authors gratefully acknowledge the liberal use of Dr. Robert A. Scarborough's article, "Carcinoma of the Colon," in the 1949 *California Cancer Commission Studies.*

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